

## SEQUENCE LISTING

<110> SCOTT, THOMAS R.  
 BORICK, HEATHER P.  
 SWIRE-CLARK, GINGER A.  
 MARCOTTE, WILLIAM R.  
 BODINE, ASHBY B.

<120> NOVEL IMMUNOTHERAPY

<130> CXU-407

<140>

<141>

<160> 14

<170> PatentIn Ver. 3.2

<210> 1

<211> 2647

<212> DNA

<213> Rattus norvegicus

<220>

<221> CDS

<222> (48)..(2645)

<400> 1

gagctcattc gcaggccaga gatgctgcga acaaggttgc aattccc	atg agg ttc	56
	Met Arg Phe	
	1	
aat ggt aaa tct ggt gtt gaa gtc cgt ctg cca aat gac cta gaa gac		104
Asn Gly Lys Ser Gly Val Glu Val Arg Leu Pro Asn Asp Leu Glu Asp		
5 10 15		
ttg aag gga tac acg tct ctg tct ttg ttc ctc caa aga cca gac tta		152
Leu Lys Gly Tyr Thr Ser Leu Ser Leu Phe Leu Gln Arg Pro Asp Leu		
20 25 30 35		
aga gag aat gga ggc act gag gac atg ttt gta atg tac ctt gga aac		200
Arg Glu Asn Gly Gly Thr Glu Asp Met Phe Val Met Tyr Leu Gly Asn		
40 45 50		
aag gat gcc tcc aag gac tac atc ggc atg gcg gtt gta gat ggc cag		248
Lys Asp Ala Ser Lys Asp Tyr Ile Gly Met Ala Val Val Asp Gly Gln		
55 60 65		
ctg acg tgt gtc tac aac ctg ggg gac cga gaa gct gaa gtt cag atc		296
Leu Thr Cys Val Tyr Asn Leu Gly Asp Arg Glu Ala Glu Val Gln Ile		
70 75 80		
gat cag gtc ctg acg gag agt gag tct cag gag gca gtt atg gac cgg		344
Asp Gln Val Leu Thr Glu Ser Glu Ser Gln Glu Ala Val Met Asp Arg		
85 90 95		

gtg aag ttc cag aga ata tat caa ttt gcc aag ctt aat tac acc aaa	392
Val Lys Phe Gln Arg Ile Tyr Gln Phe Ala Lys Leu Asn Tyr Thr Lys	
100 105 110 115	
 gaa gcc acg tcc aat aaa ccc aaa gct ccc gcg gtc tac gac ctg gag	440
Glu Ala Thr Ser Asn Lys Pro Lys Ala Pro Ala Val Tyr Asp Leu Glu	
120 125 130	
 ggg ggc agt agc aac acg ctc ctt aat ttg gat ccc gag gac gct gtg	488
Gly Gly Ser Ser Asn Thr Leu Leu Asn Leu Asp Pro Glu Asp Ala Val	
135 140 145	
 ttt tat gtc gga ggt tac cca ccg gat ttt gaa ctt cct agc aga ctg	536
Phe Tyr Val Gly Gly Tyr Pro Pro Asp Phe Glu Leu Pro Ser Arg Leu	
150 155 160	
 cgg ttc cct cca tac aaa ggc tgt atc gaa cta gat gac ctc aat gaa	584
Arg Phe Pro Pro Tyr Lys Gly Cys Ile Glu Leu Asp Asp Leu Asn Glu	
165 170 175	
 aac gtt cta agc ttg tac aat ttc aag aca act ttc aat ctc aac acc	632
Asn Val Leu Ser Leu Tyr Asn Phe Lys Thr Thr Phe Asn Leu Asn Thr	
180 185 190 195	
 acg gag gtg gag cct tgt agg agg aga aag gaa gag tca gac aaa aat	680
Thr Glu Val Glu Pro Cys Arg Arg Arg Lys Glu Glu Ser Asp Lys Asn	
200 205 210	
 tac ttt gaa ggt aca ggc tat gct cgc atc cct act caa cca aat gct	728
Tyr Phe Glu Gly Thr Gly Tyr Ala Arg Ile Pro Thr Gln Pro Asn Ala	
215 220 225	
 ccc ttc cca aac ttc ata cag acc atc cag act act gtg gac aga ggt	776
Pro Phe Pro Asn Phe Ile Gln Thr Thr Ile Gln Thr Thr Val Asp Arg Gly	
230 235 240	
 tta ctg ttc ttc gca gaa aac cag gat aac ttc ata tct ctg aac ata	824
Leu Leu Phe Phe Ala Glu Asn Gln Asp Asn Phe Ile Ser Leu Asn Ile	
245 250 255	
 gaa gat ggc aat ctc atg gtg aga tac aaa cta aat tca gag cca ccc	872
Glu Asp Gly Asn Leu Met Val Arg Tyr Lys Leu Asn Ser Glu Pro Pro	
260 265 270 275	
 aaa gag aag gga att cga gac acc atc aac gat ggg aaa gat cat tcg	920
Lys Glu Lys Gly Ile Arg Asp Thr Ile Asn Asp Gly Lys Asp His Ser	
280 285 290	
 atc tta atc aca att gga aaa cta caa aaa cgc atg tgg ata aat gtg	968
Ile Leu Ile Thr Ile Gly Lys Leu Gln Lys Arg Met Trp Ile Asn Val	
295 300 305	
 aac gaa cgc agt gta cga atc gaa ggg gaa ata ttt gat ttc agc aca	1016
Asn Glu Arg Ser Val Arg Ile Glu Gly Glu Ile Phe Asp Phe Ser Thr	
310 315 320	

tat	tat	ttg	ggc	gga	att	cca	att	gca	atc	aga	gaa	agg	ttt	aac	atc	1064
Tyr	Tyr	Leu	Gly	Gly	Ile	Pro	Ile	Ala	Ile	Arg	Glu	Arg	Phe	Asn	Ile	
	325					330					335					
tca	acg	cct	gct	ttc	caa	ggc	tgc	atg	aag	aat	ctg	aag	aaa	acc	agt	1112
Ser	Thr	Pro	Ala	Phe	Gln	Gly	Cys	Met	Lys	Asn	Leu	Lys	Lys	Thr	Ser	
	340				345					350					355	
ggg	gtt	gtc	agg	ttg	aat	gat	act	gtg	ggg	gta	acc	aag	aag	tgc	tca	1160
Gly	Val	Val	Arg	Leu	Asn	Asp	Thr	Val	Gly	Val	Thr	Lys	Lys	Cys	Ser	
				360					365					370		
gaa	gac	tgg	aag	ctt	gtg	cga	acc	gcc	tgc	ttc	tcc	aga	gga	ggg	cag	1208
Glu	Asp	Trp	Lys	Leu	Val	Arg	Thr	Ala	Ser	Phe	Ser	Arg	Gly	Gly	Gln	
			375					380					385			
atg	agc	ttt	aca	aac	ttg	gac	gtg	ccc	tgc	act	gac	cgc	ttc	cag	ctc	1256
Met	Ser	Phe	Thr	Asn	Leu	Asp	Val	Pro	Ser	Thr	Asp	Arg	Phe	Gln	Leu	
		390					395					400				
tcc	ttt	ggg	ttt	cag	acc	ttt	caa	ccc	agt	ggc	aca	ctg	ctc	aat	cat	1304
Ser	Phe	Gly	Phe	Gln	Thr	Phe	Gln	Pro	Ser	Gly	Thr	Leu	Leu	Asn	His	
	405					410					415					
cag	acg	cgg	aca	agc	agc	ctg	ctg	gtc	acc	ctg	gaa	gat	ggg	cac	att	1352
Gln	Thr	Arg	Thr	Ser	Ser	Leu	Leu	Val	Thr	Leu	Glu	Asp	Gly	His	Ile	
	420				425					430					435	
gag	ttg	agc	act	agg	gac	agc	aac	atc	cca	att	ttc	aag	tct	cca	ggg	1400
Glu	Leu	Ser	Thr	Arg	Asp	Ser	Asn	Ile	Pro	Ile	Phe	Lys	Ser	Pro	Gly	
				440					445					450		
acc	tac	atg	gac	ggg	tta	ctg	cat	cat	gta	tct	gta	ata	agt	gac	acc	1448
Thr	Tyr	Met	Asp	Gly	Leu	Leu	His	His	Val	Ser	Val	Ile	Ser	Asp	Thr	
			455					460					465			
tca	ggg	ctc	cgc	ctt	ctc	atc	gat	gac	cag	gtc	ctg	aga	agg	aac	cag	1496
Ser	Gly	Leu	Arg	Leu	Leu	Ile	Asp	Asp	Gln	Val	Leu	Arg	Arg	Asn	Gln	
	470						475					480				
agg	ctt	cct	agc	ttc	tct	aac	gcc	cag	cag	tgc	ctc	cgc	ctt	gga	gga	1544
Arg	Leu	Pro	Ser	Phe	Ser	Asn	Ala	Gln	Gln	Ser	Leu	Arg	Leu	Gly	Gly	
	485					490					495					
ggg	cat	ttc	gag	ggg	tgt	atc	agc	aat	gtt	tta	gtc	caa	agg	ttt	tca	1592
Gly	His	Phe	Glu	Gly	Cys	Ile	Ser	Asn	Val	Leu	Val	Gln	Arg	Phe	Ser	
	500				505					510					515	
cag	agt	cca	gaa	gtc	ctg	gat	ctg	gcc	agt	aaa	tct	acc	aag	aag	gat	1640
Gln	Ser	Pro	Glu	Val	Leu	Asp	Leu	Ala	Ser	Lys	Ser	Thr	Lys	Lys	Asp	
				520					525					530		
gca	tcc	cta	gga	ggc	tgc	agt	tta	aac	aag	cca	cct	ttt	ctt	atg	ttg	1688
Ala	Ser	Leu	Gly	Gly	Cys	Ser	Leu	Asn	Lys	Pro	Pro	Phe	Leu	Met	Leu	
			535					540					545			

ttt	aaa	agt	ccc	aag	aga	ttt	aac	aag	ggc	cgg	att	ttc	aat	gtt	aat	1736
Phe	Lys	Ser	Pro	Lys	Arg	Phe	Asn	Lys	Gly	Arg	Ile	Phe	Asn	Val	Asn	
		550					555					560				
cag	ctg	atg	caa	gat	gca	cct	cag	gcc	aca	agg	agc	aca	gag	gct	tgg	1784
Gln	Leu	Met	Gln	Asp	Ala	Pro	Gln	Ala	Thr	Arg	Ser	Thr	Glu	Ala	Trp	
	565					570					575					
caa	gat	ggg	agg	tcc	tgc	cta	cca	cct	ctg	aac	acc	aag	gcc	tct	cac	1832
Gln	Asp	Gly	Arg	Ser	Cys	Leu	Pro	Pro	Leu	Asn	Thr	Lys	Ala	Ser	His	
580					585					590					595	
aga	gcc	ctg	cag	ttt	gga	gac	agc	ccc	acc	agc	cac	ttg	cta	ctc	aag	1880
Arg	Ala	Leu	Gln	Phe	Gly	Asp	Ser	Pro	Thr	Ser	His	Leu	Leu	Leu	Lys	
				600					605					610		
ctt	ccc	cag	gaa	ctg	ctg	aaa	cct	agg	tca	cag	ttt	tct	tta	gac	ata	1928
Leu	Pro	Gln	Glu	Leu	Leu	Lys	Pro	Arg	Ser	Gln	Phe	Ser	Leu	Asp	Ile	
		615						620					625			
cag	aca	act	tcc	ccc	aaa	gga	ctg	gtg	ttt	tac	gca	ggc	acc	aag	gac	1976
Gln	Thr	Thr	Ser	Pro	Lys	Gly	Leu	Val	Phe	Tyr	Ala	Gly	Thr	Lys	Asp	
	630					635						640				
tcc	ttc	ctg	gct	ctt	tat	gtc	gca	gat	ggc	cgt	gtt	gtc	ttt	gct	ttg	2024
Ser	Phe	Leu	Ala	Leu	Tyr	Val	Ala	Asp	Gly	Arg	Val	Val	Phe	Ala	Leu	
	645					650					655					
ggg	gca	gga	ggg	aag	aaa	ctg	aga	ctc	agg	agc	aag	gag	aga	tac	cat	2072
Gly	Ala	Gly	Gly	Lys	Lys	Leu	Arg	Leu	Arg	Ser	Lys	Glu	Arg	Tyr	His	
660					665					670					675	
gac	ggg	aag	tgg	cac	acg	gtg	gtg	ttc	gga	cta	aat	gga	gga	aag	gca	2120
Asp	Gly	Lys	Trp	His	Thr	Val	Val	Phe	Gly	Leu	Asn	Gly	Gly	Lys	Ala	
				680					685					690		
cgc	ctg	gtt	gtg	gat	ggg	cta	agg	gcc	cag	gaa	ggc	agt	ttg	cct	gga	2168
Arg	Leu	Val	Val	Asp	Gly	Leu	Arg	Ala	Gln	Glu	Gly	Ser	Leu	Pro	Gly	
		695						700					705			
aat	tct	acc	atc	agc	ccc	aga	gaa	cag	gtt	tac	cta	ggg	ttg	ccg	cta	2216
Asn	Ser	Thr	Ile	Ser	Pro	Arg	Glu	Gln	Val	Tyr	Leu	Gly	Leu	Pro	Leu	
		710					715					720				
tca	aga	aag	cca	aag	agc	cta	ccc	cag	cac	agt	ttt	gtg	ggg	tgc	ctg	2264
Ser	Arg	Lys	Pro	Lys	Ser	Leu	Pro	Gln	His	Ser	Phe	Val	Gly	Cys	Leu	
	725					730					735					
aga	gat	ttc	cag	ttg	aac	tcg	aaa	ccc	ctg	gat	tct	cct	tct	gcg	agg	2312
Arg	Asp	Phe	Gln	Leu	Asn	Ser	Lys	Pro	Leu	Asp	Ser	Pro	Ser	Ala	Arg	
740					745					750					755	
ttt	ggg	gta	tct	ccc	tgc	ttg	ggg	ggc	tct	tta	gag	aaa	ggc	att	tat	2360
Phe	Gly	Val	Ser	Pro	Cys	Leu	Gly	Gly	Ser	Leu	Glu	Lys	Gly	Ile	Tyr	
				760					765					770		

ttc tcc caa gga gga ggc cat gtg atc cta gcc aat tct gtg tcc ttg	2408
Phe Ser Gln Gly Gly Gly His Val Ile Leu Ala Asn Ser Val Ser Leu	
775 780 785	
ggg cca gag ctt aag ctc act ttc agc att cgc cca cgg agt ctc act	2456
Gly Pro Glu Leu Lys Leu Thr Phe Ser Ile Arg Pro Arg Ser Leu Thr	
790 795 800	
ggg gtc tta ata cac gtc gga agt caa tct gga cag cgc tta agt gtg	2504
Gly Val Leu Ile His Val Ser Gln Ser Gly Gln Arg Leu Ser Val	
805 810 815	
tac atg gag gca gga aag gtc aca acc tct gtg agc agt gat gca gga	2552
Tyr Met Glu Ala Gly Lys Val Thr Thr Ser Val Ser Ser Asp Ala Gly	
820 825 830 835	
gga agt gtg aca tca att aca ccg aag cag tct ctg tgt gat gga cag	2600
Gly Ser Val Thr Ser Ile Thr Pro Lys Gln Ser Leu Cys Asp Gly Gln	
840 845 850	
tgg cac tcg gtg gca gtc tcc att aaa cag cgc atc ctg cat cta ga	2647
Trp His Ser Val Ala Val Ser Ile Lys Gln Arg Ile Leu His Leu	
855 860 865	

&lt;210&gt; 2

&lt;211&gt; 866

&lt;212&gt; PRT

&lt;213&gt; Rattus norvegicus

&lt;400&gt; 2

Met Arg Phe Asn Gly Lys Ser Gly Val Glu Val Arg Leu Pro Asn Asp	
1 5 10 15	
Leu Glu Asp Leu Lys Gly Tyr Thr Ser Leu Ser Leu Phe Leu Gln Arg	
20 25 30	
Pro Asp Leu Arg Glu Asn Gly Gly Thr Glu Asp Met Phe Val Met Tyr	
35 40 45	
Leu Gly Asn Lys Asp Ala Ser Lys Asp Tyr Ile Gly Met Ala Val Val	
50 55 60	
Asp Gly Gln Leu Thr Cys Val Tyr Asn Leu Gly Asp Arg Glu Ala Glu	
65 70 75 80	
Val Gln Ile Asp Gln Val Leu Thr Glu Ser Glu Ser Gln Glu Ala Val	
85 90 95	
Met Asp Arg Val Lys Phe Gln Arg Ile Tyr Gln Phe Ala Lys Leu Asn	
100 105 110	
Tyr Thr Lys Glu Ala Thr Ser Asn Lys Pro Lys Ala Pro Ala Val Tyr	
115 120 125	
Asp Leu Glu Gly Gly Ser Ser Asn Thr Leu Leu Asn Leu Asp Pro Glu	
130 135 140	

Asp	Ala	Val	Phe	Tyr	Val	Gly	Gly	Tyr	Pro	Pro	Asp	Phe	Glu	Leu	Pro	145	150	155	160
Ser	Arg	Leu	Arg	Phe	Pro	Pro	Tyr	Lys	Gly	Cys	Ile	Glu	Leu	Asp	Asp	165	170	175	
Leu	Asn	Glu	Asn	Val	Leu	Ser	Leu	Tyr	Asn	Phe	Lys	Thr	Thr	Phe	Asn	180	185	190	
Leu	Asn	Thr	Thr	Glu	Val	Glu	Pro	Cys	Arg	Arg	Arg	Lys	Glu	Glu	Ser	195	200	205	
Asp	Lys	Asn	Tyr	Phe	Glu	Gly	Thr	Gly	Tyr	Ala	Arg	Ile	Pro	Thr	Gln	210	215	220	
Pro	Asn	Ala	Pro	Phe	Pro	Asn	Phe	Ile	Gln	Thr	Ile	Gln	Thr	Thr	Val	225	230	235	240
Asp	Arg	Gly	Leu	Leu	Phe	Phe	Ala	Glu	Asn	Gln	Asp	Asn	Phe	Ile	Ser	245	250	255	
Leu	Asn	Ile	Glu	Asp	Gly	Asn	Leu	Met	Val	Arg	Tyr	Lys	Leu	Asn	Ser	260	265	270	
Glu	Pro	Pro	Lys	Glu	Lys	Gly	Ile	Arg	Asp	Thr	Ile	Asn	Asp	Gly	Lys	275	280	285	
Asp	His	Ser	Ile	Leu	Ile	Thr	Ile	Gly	Lys	Leu	Gln	Lys	Arg	Met	Trp	290	295	300	
Ile	Asn	Val	Asn	Glu	Arg	Ser	Val	Arg	Ile	Glu	Gly	Glu	Ile	Phe	Asp	305	310	315	320
Phe	Ser	Thr	Tyr	Tyr	Leu	Gly	Gly	Ile	Pro	Ile	Ala	Ile	Arg	Glu	Arg	325	330	335	
Phe	Asn	Ile	Ser	Thr	Pro	Ala	Phe	Gln	Gly	Cys	Met	Lys	Asn	Leu	Lys	340	345	350	
Lys	Thr	Ser	Gly	Val	Val	Arg	Leu	Asn	Asp	Thr	Val	Gly	Val	Thr	Lys	355	360	365	
Lys	Cys	Ser	Glu	Asp	Trp	Lys	Leu	Val	Arg	Thr	Ala	Ser	Phe	Ser	Arg	370	375	380	
Gly	Gly	Gln	Met	Ser	Phe	Thr	Asn	Leu	Asp	Val	Pro	Ser	Thr	Asp	Arg	385	390	395	400
Phe	Gln	Leu	Ser	Phe	Gly	Phe	Gln	Thr	Phe	Gln	Pro	Ser	Gly	Thr	Leu	405	410	415	
Leu	Asn	His	Gln	Thr	Arg	Thr	Ser	Ser	Leu	Leu	Val	Thr	Leu	Glu	Asp	420	425	430	
Gly	His	Ile	Glu	Leu	Ser	Thr	Arg	Asp	Ser	Asn	Ile	Pro	Ile	Phe	Lys	435	440	445	

Ser Pro Gly Thr Tyr Met Asp Gly Leu Leu His His Val Ser Val Ile  
 450 455 460  
 Ser Asp Thr Ser Gly Leu Arg Leu Leu Ile Asp Asp Gln Val Leu Arg  
 465 470 475 480  
 Arg Asn Gln Arg Leu Pro Ser Phe Ser Asn Ala Gln Gln Ser Leu Arg  
 485 490 495  
 Leu Gly Gly Gly His Phe Glu Gly Cys Ile Ser Asn Val Leu Val Gln  
 500 505 510  
 Arg Phe Ser Gln Ser Pro Glu Val Leu Asp Leu Ala Ser Lys Ser Thr  
 515 520 525  
 Lys Lys Asp Ala Ser Leu Gly Gly Cys Ser Leu Asn Lys Pro Pro Phe  
 530 535 540  
 Leu Met Leu Phe Lys Ser Pro Lys Arg Phe Asn Lys Gly Arg Ile Phe  
 545 550 555 560  
 Asn Val Asn Gln Leu Met Gln Asp Ala Pro Gln Ala Thr Arg Ser Thr  
 565 570 575  
 Glu Ala Trp Gln Asp Gly Arg Ser Cys Leu Pro Pro Leu Asn Thr Lys  
 580 585 590  
 Ala Ser His Arg Ala Leu Gln Phe Gly Asp Ser Pro Thr Ser His Leu  
 595 600 605  
 Leu Leu Lys Leu Pro Gln Glu Leu Leu Lys Pro Arg Ser Gln Phe Ser  
 610 615 620  
 Leu Asp Ile Gln Thr Thr Ser Pro Lys Gly Leu Val Phe Tyr Ala Gly  
 625 630 635 640  
 Thr Lys Asp Ser Phe Leu Ala Leu Tyr Val Ala Asp Gly Arg Val Val  
 645 650 655  
 Phe Ala Leu Gly Ala Gly Gly Lys Lys Leu Arg Leu Arg Ser Lys Glu  
 660 665 670  
 Arg Tyr His Asp Gly Lys Trp His Thr Val Val Phe Gly Leu Asn Gly  
 675 680 685  
 Gly Lys Ala Arg Leu Val Val Asp Gly Leu Arg Ala Gln Glu Gly Ser  
 690 695 700  
 Leu Pro Gly Asn Ser Thr Ile Ser Pro Arg Glu Gln Val Tyr Leu Gly  
 705 710 715 720  
 Leu Pro Leu Ser Arg Lys Pro Lys Ser Leu Pro Gln His Ser Phe Val  
 725 730 735  
 Gly Cys Leu Arg Asp Phe Gln Leu Asn Ser Lys Pro Leu Asp Ser Pro  
 740 745 750

Ser Ala Arg Phe Gly Val Ser Pro Cys Leu Gly Gly Ser Leu Glu Lys  
755 760 765

Gly Ile Tyr Phe Ser Gln Gly Gly Gly His Val Ile Leu Ala Asn Ser  
770 775 780

Val Ser Leu Gly Pro Glu Leu Lys Leu Thr Phe Ser Ile Arg Pro Arg  
785 790 795 800

Ser Leu Thr Gly Val Leu Ile His Val Gly Ser Gln Ser Gly Gln Arg  
805 810 815

Leu Ser Val Tyr Met Glu Ala Gly Lys Val Thr Thr Ser Val Ser Ser  
820 825 830

Asp Ala Gly Gly Ser Val Thr Ser Ile Thr Pro Lys Gln Ser Leu Cys  
835 840 845

Asp Gly Gln Trp His Ser Val Ala Val Ser Ile Lys Gln Arg Ile Leu  
850 855 860

His Leu  
865

<210> 3  
<211> 1743  
<212> DNA  
<213> Rattus norvegicus

<220>  
<221> CDS  
<222> (49) .. (1743)

<400> 3  
gagctcattc agcaggccag agatgctgcg aacaagggttg caattccc atg agg ttc 57  
Met Arg Phe  
1

aat ggt aaa tct ggt gtt gaa gtc cgt ctg cca aat gac cta gaa gac 105  
Asn Gly Lys Ser Gly Val Glu Val Arg Leu Pro Asn Asp Leu Glu Asp  
5 10 15

ttg aag gga tac acg tct ctg tct ttg ttc ctc caa aga cca gac tta 153  
Leu Lys Gly Tyr Thr Ser Leu Ser Leu Phe Leu Gln Arg Pro Asp Leu  
20 25 30 35

aga gag aat gga ggc act gag gac atg ttt gta atg tac ctt gga aac 201  
Arg Glu Asn Gly Gly Thr Glu Asp Met Phe Val Met Tyr Leu Gly Asn  
40 45 50

aag gat gcc tcc aag gac tac atc ggc atg gcg gtt gta gat ggc cag 249  
Lys Asp Ala Ser Lys Asp Tyr Ile Gly Met Ala Val Val Asp Gly Gln  
55 60 65

ctg acg tgt gtc tac aac ctg ggg gac cga gaa gct gaa gtt cag atc 297  
Leu Thr Cys Val Tyr Asn Leu Gly Asp Arg Glu Ala Glu Val Gln Ile  
70 75 80



gat	cag	gtc	ctg	acg	gag	agt	gag	tct	cag	gag	gca	gtt	atg	gac	cgg	345
Asp	Gln	Val	Leu	Thr	Glu	Ser	Glu	Ser	Gln	Glu	Ala	Val	Met	Asp	Arg	
	85					90					95					
gtg	aag	ttc	cag	aga	ata	tat	caa	ttt	gcc	aag	ctt	aat	tac	acc	aaa	393
Val	Lys	Phe	Gln	Arg	Ile	Tyr	Gln	Phe	Ala	Lys	Leu	Asn	Tyr	Thr	Lys	
100					105				110						115	
gaa	gcc	acg	tcc	aat	aaa	ccc	aaa	gct	ccc	gcg	gtc	tac	gac	ctg	gag	441
Glu	Ala	Thr	Ser	Asn	Lys	Pro	Lys	Ala	Pro	Ala	Val	Tyr	Asp	Leu	Glu	
				120					125					130		
ggg	ggc	agt	agc	aac	acg	ctc	ctt	aat	ttg	gat	ccc	gag	gac	gct	gtg	489
Gly	Gly	Ser	Ser	Asn	Thr	Leu	Leu	Asn	Leu	Asp	Pro	Glu	Asp	Ala	Val	
			135					140					145			
ttt	tat	gtc	gga	ggg	tac	cca	ccg	gat	ttt	gaa	ctt	cct	agc	aga	ctg	537
Phe	Tyr	Val	Gly	Gly	Tyr	Pro	Pro	Asp	Phe	Glu	Leu	Pro	Ser	Arg	Leu	
		150					155					160				
cgg	ttc	cct	cca	tac	aaa	ggc	tgt	atc	gaa	cta	gat	gac	ctc	aat	gaa	585
Arg	Phe	Pro	Pro	Tyr	Lys	Gly	Cys	Ile	Glu	Leu	Asp	Asp	Leu	Asn	Glu	
	165					170					175					
aac	gtt	cta	agc	ttg	tac	aat	ttc	aag	aca	act	ttc	aat	ctc	aac	acc	633
Asn	Val	Leu	Ser	Leu	Tyr	Asn	Phe	Lys	Thr	Thr	Phe	Asn	Leu	Asn	Thr	
180					185					190					195	
acg	gag	gtg	gag	cct	tgt	agg	agg	aga	aag	gaa	gag	tca	gac	aaa	aat	681
Thr	Glu	Val	Glu	Pro	Cys	Arg	Arg	Arg	Lys	Glu	Glu	Ser	Asp	Lys	Asn	
				200					205					210		
tac	ttt	gaa	ggg	aca	ggc	tat	gct	cgc	atc	cct	act	caa	cca	aat	gct	729
Tyr	Phe	Glu	Gly	Thr	Gly	Tyr	Ala	Arg	Ile	Pro	Thr	Gln	Pro	Asn	Ala	
			215					220					225			
ccc	ttc	cca	aac	ttc	ata	cag	acc	atc	cag	act	act	gtg	gac	aga	ggg	777
Pro	Phe	Pro	Asn	Phe	Ile	Gln	Thr	Ile	Gln	Thr	Thr	Val	Asp	Arg	Gly	
		230					235					240				
tta	ctg	ttc	ttc	gca	gaa	aac	cag	gat	aac	ttc	ata	tct	ctg	aac	ata	825
Leu	Leu	Phe	Phe	Ala	Glu	Asn	Gln	Asp	Asn	Phe	Ile	Ser	Leu	Asn	Ile	
	245					250					255					
gaa	gat	ggc	aat	ctc	atg	gtg	aga	tac	aaa	cta	aat	tca	gag	cca	ccc	873
Glu	Asp	Gly	Asn	Leu	Met	Val	Arg	Tyr	Lys	Leu	Asn	Ser	Glu	Pro	Pro	
260					265					270					275	
aaa	gag	aag	gga	att	cga	gac	acc	atc	aac	gat	ggg	aaa	gat	cat	tcg	921
Lys	Glu	Lys	Gly	Ile	Arg	Asp	Thr	Ile	Asn	Asp	Gly	Lys	Asp	His	Ser	
				280					285					290		
atc	tta	atc	aca	att	gga	aaa	cta	caa	aaa	cgc	atg	tggt	ata	aat	gtg	969
Ile	Leu	Ile	Thr	Ile	Gly	Lys	Leu	Gln	Lys	Arg	Met	Trp	Ile	Asn	Val	
			295					300					305			

aac gaa cgc agt gta cga atc gaa ggg gaa ata ttt gat ttc agc aca	1017
Asn Glu Arg Ser Val Arg Ile Glu Gly Glu Ile Phe Asp Phe Ser Thr	
310 315 320	
tat tat ttg ggc gga att cca att gca atc aga gaa agg ttt aac atc	1065
Tyr Tyr Leu Gly Gly Ile Pro Ile Ala Ile Arg Glu Arg Phe Asn Ile	
325 330 335	
tca acg cct gct ttc caa ggc tgc atg aag aat ctg aag aaa acc agt	1113
Ser Thr Pro Ala Phe Gln Gly Cys Met Lys Asn Leu Lys Lys Thr Ser	
340 345 350 355	
ggg gtt gtc agg ttg aat gat act gtg ggt gta acc aag aag tgc tca	1161
Gly Val Val Arg Leu Asn Asp Thr Val Gly Val Thr Lys Lys Cys Ser	
360 365 370	
gaa gac tgg aag ctt gtg cga acc gcc tcg ttc tcc aga gga ggg cag	1209
Glu Asp Trp Lys Leu Val Arg Thr Ala Ser Phe Ser Arg Gly Gly Gln	
375 380 385	
atg agc ttt aca aac ttg gac gtg ccc tcg act gac cgc ttc cag ctc	1257
Met Ser Phe Thr Asn Leu Asp Val Pro Ser Thr Asp Arg Phe Gln Leu	
390 395 400	
tcc ttt ggg ttt cag acc ttt caa ccc agt ggc aca ctg ctc aat cat	1305
Ser Phe Gly Phe Gln Thr Phe Gln Pro Ser Gly Thr Leu Leu Asn His	
405 410 415	
cag acg cgg aca agc agc ctg ctg gtc acc ctg gaa gat ggg cac att	1353
Gln Thr Arg Thr Ser Ser Leu Leu Val Thr Leu Glu Asp Gly His Ile	
420 425 430 435	
gag ttg agc act agg gac agc aac atc cca att ttc aag tct cca ggg	1401
Glu Leu Ser Thr Arg Asp Ser Asn Ile Pro Ile Phe Lys Ser Pro Gly	
440 445 450	
acc tac atg gac ggt tta ctg cat cat gta tct gta ata agt gac acc	1449
Thr Tyr Met Asp Gly Leu Leu His His Val Ser Val Ile Ser Asp Thr	
455 460 465	
tca ggt ctc cgc ctt ctc atc gat gac cag gtc ctg aga agg aac cag	1497
Ser Gly Leu Arg Leu Leu Ile Asp Asp Gln Val Leu Arg Arg Asn Gln	
470 475 480	
agg ctt cct agc ttc tct aac gcc cag cag tcg ctc cgc ctt gga gga	1545
Arg Leu Pro Ser Phe Ser Asn Ala Gln Gln Ser Leu Arg Leu Gly Gly	
485 490 495	
ggg cat ttc gag ggt tgt atc agc aat gtt tta gtc caa agg ttt tca	1593
Gly His Phe Glu Gly Cys Ile Ser Asn Val Leu Val Gln Arg Phe Ser	
500 505 510 515	
cag agt cca gaa gtc ctg gat ctg gcc agt aaa tct acc aag aag gat	1641
Gln Ser Pro Glu Val Leu Asp Leu Ala Ser Lys Ser Thr Lys Lys Asp	
520 525 530	

gca tcc cta gga ggc tgc agt tta aac aag cca cct ttt ctt atg ttg 1689  
 Ala Ser Leu Gly Gly Cys Ser Leu Asn Lys Pro Pro Phe Leu Met Leu  
                   535                                  540                                  545

ttt aaa agt ccc aag aga ttt aac aag ggc cgg att ttc aat gtt aat 1737  
 Phe Lys Ser Pro Lys Arg Phe Asn Lys Gly Arg Ile Phe Asn Val Asn  
                   550                                  555                                  560

cag ctg 1743  
 Gln Leu  
           565

<210> 4  
 <211> 565  
 <212> PRT  
 <213> Rattus norvegicus

<400> 4  
 Met Arg Phe Asn Gly Lys Ser Gly Val Glu Val Arg Leu Pro Asn Asp  
   1                  5                                  10                                  15  
 Leu Glu Asp Leu Lys Gly Tyr Thr Ser Leu Ser Leu Phe Leu Gln Arg  
                   20                                  25                                  30  
 Pro Asp Leu Arg Glu Asn Gly Gly Thr Glu Asp Met Phe Val Met Tyr  
                   35                                  40                                  45  
 Leu Gly Asn Lys Asp Ala Ser Lys Asp Tyr Ile Gly Met Ala Val Val  
                   50                                  55                                  60  
 Asp Gly Gln Leu Thr Cys Val Tyr Asn Leu Gly Asp Arg Glu Ala Glu  
                   65                                  70                                  75                                  80  
 Val Gln Ile Asp Gln Val Leu Thr Glu Ser Glu Ser Gln Glu Ala Val  
                   85                                  90                                  95  
 Met Asp Arg Val Lys Phe Gln Arg Ile Tyr Gln Phe Ala Lys Leu Asn  
                   100                                  105                                  110  
 Tyr Thr Lys Glu Ala Thr Ser Asn Lys Pro Lys Ala Pro Ala Val Tyr  
                   115                                  120                                  125  
 Asp Leu Glu Gly Gly Ser Ser Asn Thr Leu Leu Asn Leu Asp Pro Glu  
                   130                                  135                                  140  
 Asp Ala Val Phe Tyr Val Gly Gly Tyr Pro Pro Asp Phe Glu Leu Pro  
                   145                                  150                                  155                                  160  
 Ser Arg Leu Arg Phe Pro Pro Tyr Lys Gly Cys Ile Glu Leu Asp Asp  
                   165                                  170                                  175  
 Leu Asn Glu Asn Val Leu Ser Leu Tyr Asn Phe Lys Thr Thr Phe Asn  
                   180                                  185                                  190  
 Leu Asn Thr Thr Glu Val Glu Pro Cys Arg Arg Arg Lys Glu Glu Ser  
                   195                                  200                                  205

Asp	Lys	Asn	Tyr	Phe	Glu	Gly	Thr	Gly	Tyr	Ala	Arg	Ile	Pro	Thr	Gln	210	215	220
Pro	Asn	Ala	Pro	Phe	Pro	Asn	Phe	Ile	Gln	Thr	Ile	Gln	Thr	Thr	Val	225	230	235
Asp	Arg	Gly	Leu	Leu	Phe	Phe	Ala	Glu	Asn	Gln	Asp	Asn	Phe	Ile	Ser	245	250	255
Leu	Asn	Ile	Glu	Asp	Gly	Asn	Leu	Met	Val	Arg	Tyr	Lys	Leu	Asn	Ser	260	265	270
Glu	Pro	Pro	Lys	Glu	Lys	Gly	Ile	Arg	Asp	Thr	Ile	Asn	Asp	Gly	Lys	275	280	285
Asp	His	Ser	Ile	Leu	Ile	Thr	Ile	Gly	Lys	Leu	Gln	Lys	Arg	Met	Trp	290	295	300
Ile	Asn	Val	Asn	Glu	Arg	Ser	Val	Arg	Ile	Glu	Gly	Glu	Ile	Phe	Asp	305	310	315
Phe	Ser	Thr	Tyr	Tyr	Leu	Gly	Gly	Ile	Pro	Ile	Ala	Ile	Arg	Glu	Arg	325	330	335
Phe	Asn	Ile	Ser	Thr	Pro	Ala	Phe	Gln	Gly	Cys	Met	Lys	Asn	Leu	Lys	340	345	350
Lys	Thr	Ser	Gly	Val	Val	Arg	Leu	Asn	Asp	Thr	Val	Gly	Val	Thr	Lys	355	360	365
Lys	Cys	Ser	Glu	Asp	Trp	Lys	Leu	Val	Arg	Thr	Ala	Ser	Phe	Ser	Arg	370	375	380
Gly	Gly	Gln	Met	Ser	Phe	Thr	Asn	Leu	Asp	Val	Pro	Ser	Thr	Asp	Arg	385	390	395
Phe	Gln	Leu	Ser	Phe	Gly	Phe	Gln	Thr	Phe	Gln	Pro	Ser	Gly	Thr	Leu	405	410	415
Leu	Asn	His	Gln	Thr	Arg	Thr	Ser	Ser	Leu	Leu	Val	Thr	Leu	Glu	Asp	420	425	430
Gly	His	Ile	Glu	Leu	Ser	Thr	Arg	Asp	Ser	Asn	Ile	Pro	Ile	Phe	Lys	435	440	445
Ser	Pro	Gly	Thr	Tyr	Met	Asp	Gly	Leu	Leu	His	His	Val	Ser	Val	Ile	450	455	460
Ser	Asp	Thr	Ser	Gly	Leu	Arg	Leu	Leu	Ile	Asp	Asp	Gln	Val	Leu	Arg	465	470	475
Arg	Asn	Gln	Arg	Leu	Pro	Ser	Phe	Ser	Asn	Ala	Gln	Gln	Ser	Leu	Arg	485	490	495
Leu	Gly	Gly	Gly	His	Phe	Glu	Gly	Cys	Ile	Ser	Asn	Val	Leu	Val	Gln	500	505	510

Arg Phe Ser Gln Ser Pro Glu Val Leu Asp Leu Ala Ser Lys Ser Thr  
 515 520 525

Lys Lys Asp Ala Ser Leu Gly Gly Cys Ser Leu Asn Lys Pro Pro Phe  
 530 535 540

Leu Met Leu Phe Lys Ser Pro Lys Arg Phe Asn Lys Gly Arg Ile Phe  
 545 550 555 560

Asn Val Asn Gln Leu  
 565

<210> 5  
 <211> 713  
 <212> DNA  
 <213> Rattus norvegicus

<220>  
 <221> CDS  
 <222> (60)..(713)

<400> 5  
 gaattccaat tgcaatcaga gaaagggttta acatctcaac gcctgctttc caaggctgc 59

atg aag aat ctg aag aaa acc agt ggg gtt gtc agg ttg aat gat act 107  
 Met Lys Asn Leu Lys Lys Thr Ser Gly Val Val Arg Leu Asn Asp Thr  
 1 5 10 15

gtg ggt gta acc aag aag tgc tca gaa gac tgg aag ctt gtg cga acc 155  
 Val Gly Val Thr Lys Lys Cys Ser Glu Asp Trp Lys Leu Val Arg Thr  
 20 25 30

gcc tcg ttc tcc aga gga ggg cag atg agc ttt aca aac ttg gac gtg 203  
 Ala Ser Phe Ser Arg Gly Gly Gln Met Ser Phe Thr Asn Leu Asp Val  
 35 40 45

ccc tcg act gac cgc ttc cag ctc tcc ttt ggg ttt cag acc ttt caa 251  
 Pro Ser Thr Asp Arg Phe Gln Leu Ser Phe Gly Phe Gln Thr Phe Gln  
 50 55 60

ccc agt ggc aca ctg ctc aat cat cag acg cgg aca agc agc ctg ctg 299  
 Pro Ser Gly Thr Leu Leu Asn His Gln Thr Arg Thr Ser Ser Leu Leu  
 65 70 75 80

gtc acc ctg gaa gat ggg cac att gag ttg agc act agg gac agc aac 347  
 Val Thr Leu Glu Asp Gly His Ile Glu Leu Ser Thr Arg Asp Ser Asn  
 85 90 95

atc cca att ttc aag tct cca ggg acc tac atg gac ggt tta ctg cat 395  
 Ile Pro Ile Phe Lys Ser Pro Gly Thr Tyr Met Asp Gly Leu Leu His  
 100 105 110

cat gta tct gta ata agt gac acc tca ggt ctc cgc ctt ctc atc gat 443  
 His Val Ser Val Ile Ser Asp Thr Ser Gly Leu Arg Leu Leu Ile Asp  
 115 120 125

gac cag gtc ctg aga agg aac cag agg ctt cct agc ttc tct aac gcc 491  
 Asp Gln Val Leu Arg Arg Asn Gln Arg Leu Pro Ser Phe Ser Asn Ala  
 130 135 140  
  
 cag cag tcg ctc cgc ctt gga gga ggt cat ttc gag ggt tgt atc agc 539  
 Gln Gln Ser Leu Arg Leu Gly Gly Gly His Phe Glu Gly Cys Ile Ser  
 145 150 155 160  
  
 aat gtt tta gtc caa agg ttt tca cag agt cca gaa gtc ctg gat ctg 587  
 Asn Val Leu Val Gln Arg Phe Ser Gln Ser Pro Glu Val Leu Asp Leu  
 165 170 175  
  
 gcc agt aaa tct acc aag aag gat gca tcc cta gga ggc tgc agt tta 635  
 Ala Ser Lys Ser Thr Lys Lys Asp Ala Ser Leu Gly Gly Cys Ser Leu  
 180 185 190  
  
 aac aag cca cct ttt ctt atg ttg ttt aaa agt ccc aag aga ttt aac 683  
 Asn Lys Pro Pro Phe Leu Met Leu Phe Lys Ser Pro Lys Arg Phe Asn  
 195 200 205  
  
 aag ggc cgg att ttc aat gtt aat cag ctg 713  
 Lys Gly Arg Ile Phe Asn Val Asn Gln Leu  
 210 215

<210> 6  
 <211> 218  
 <212> PRT  
 <213> Rattus norvegicus

<400> 6  
 Met Lys Asn Leu Lys Lys Thr Ser Gly Val Val Arg Leu Asn Asp Thr  
 1 5 10 15  
  
 Val Gly Val Thr Lys Lys Cys Ser Glu Asp Trp Lys Leu Val Arg Thr  
 20 25 30  
  
 Ala Ser Phe Ser Arg Gly Gly Gln Met Ser Phe Thr Asn Leu Asp Val  
 35 40 45  
  
 Pro Ser Thr Asp Arg Phe Gln Leu Ser Phe Gly Phe Gln Thr Phe Gln  
 50 55 60  
  
 Pro Ser Gly Thr Leu Leu Asn His Gln Thr Arg Thr Ser Ser Leu Leu  
 65 70 75 80  
  
 Val Thr Leu Glu Asp Gly His Ile Glu Leu Ser Thr Arg Asp Ser Asn  
 85 90 95  
  
 Ile Pro Ile Phe Lys Ser Pro Gly Thr Tyr Met Asp Gly Leu Leu His  
 100 105 110  
  
 His Val Ser Val Ile Ser Asp Thr Ser Gly Leu Arg Leu Leu Ile Asp  
 115 120 125  
  
 Asp Gln Val Leu Arg Arg Asn Gln Arg Leu Pro Ser Phe Ser Asn Ala  
 130 135 140

15

Gln Gln Ser Leu Arg Leu Gly Gly Gly His Phe Glu Gly Cys Ile Ser  
145 150 155 160  
Asn Val Leu Val Gln Arg Phe Ser Gln Ser Pro Glu Val Leu Asp Leu  
165 170 175  
Ala Ser Lys Ser Thr Lys Lys Asp Ala Ser Leu Gly Gly Cys Ser Leu  
180 185 190  
Asn Lys Pro Pro Phe Leu Met Leu Phe Lys Ser Pro Lys Arg Phe Asn  
195 200 205  
Lys Gly Arg Ile Phe Asn Val Asn Gln Leu  
210 215

<210> 7  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
primer

<400> 7  
aattaaccct cactaaaggg 20

<210> 8  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
primer

<400> 8  
taatacgact cactataggg 20

<210> 9  
<211> 21  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
primer

<400> 9  
ccagactact gtggacagag g 21

<210> 10  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 primer

<400> 10  
 aagggttctt cgtgtgtagg g 21

<210> 11  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 primer

<400> 11  
 ctactcaacc aaatgctccc 20

<210> 12  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 primer

<400> 12  
 gtactattca acctgacaac cc 22

<210> 13  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 oligonucleotide

<400> 13  
 gactggttcc aattgacaag c 21

<210> 14  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence



&lt;220&gt;

<223> Description of Artificial Sequence: Synthetic  
oligonucleotide

&lt;400&gt; 14

gcaaattggca ttctgacatc c

21